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# Improving Access to Care: Mobile Dental Units

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IMPROVING ACCESS TO CARE: MOBILE DENTAL UNITS

A Capstone Experience/Thesis Project

Presented in Partial Fulfillment of the Requirements for

the Degree Bachelor of Science with

Honors College Graduate Distinction at Western Kentucky University

By

Caitlin Stephens

\*\*\*\*\*

Western Kentucky University  
2014

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## ABSTRACT

Despite efforts to improve oral health, untreated childhood tooth decay continues to be a major concern in the state of Kentucky. It is said that an estimated 42.8 percent of children in Kentucky suffer from early childhood caries (ECC) before the age of five and 39.3 percent of these children have never been in a dental office (The Kentucky Oral Health Summit). Another study conducted revealed that approximately 20 percent of preschoolers, 50 percent of second graders and 75 percent of 15 years olds are affected by untreated tooth decay (Kentucky's Dental Access Summit, 2013). What are the major issues influencing these severe statistics? Factors typically cited include living in rural areas and/or not having insurance, both which may result in a lack of access to dental care.

In order to collect the data, the researcher used the records of the Western Kentucky University Mobile Dental Unit to assess the area of residence of fifteen patients, whether or not they have insurance, and if there is a presence of dental decay. From these data the researcher then determined if there is a correlation between rural conditions and lack of access to care in relation to untreated tooth decay.

After analyzing the data collected, it was evident in this particular study that urban and rural areas had nearly the same DMF scores, which would indicate similar access to care. These results are contrary to what has been reported in the literature; that

rural areas have higher DMF scores, lower rates of insurance and less access to care. The significance of the results may indicate that mobile units in the Kentucky area are improving access to care.

Keywords: DMF, dmft, ECC, Urban, Rural

Dedicated to my family and the Faculty and Staff of the WKU Dental Hygiene Program  
who strive on a daily basis to make my dream of being  
a great dental hygienist a possibility.

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To the Dental Hygiene Class of 2014 for all of the wonderful memories together.



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## FIELDS OF STUDY

Major Field: Dental Hygiene

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## CHAPTER 1

### INTRODUCTION

Despite efforts to improve oral health, untreated childhood tooth decay continues to be a major concern in the state of Kentucky and the entire United States. It is said that an estimated 42.8 percent of children in Kentucky suffer from early childhood caries (ECC) before the age of five and 39.3 percent of these children have never been in a dental office (The Kentucky Oral Health Summit, 2013). Another study conducted revealed that approximately 20 percent of Kentucky preschoolers, 50 percent of second graders and 75 percent of 15 years olds are affected by untreated tooth decay (Kentucky's Dental Access Summit, 2013). According to the National Institute of Dental and Craniofacial Research, the United States as a whole has high rankings when it comes to lack of dental care. What are the major issues influencing these severe statistics? Factors typically cited include living in rural areas and/or not having insurance, both which may result in a lack of access to dental care.

Over 40 percent of children in the United States have had dental caries in their primary teeth and 23 percent of these have gone untreated. It is often thought that the primary dentition is not as important because it will eventually be replaced with the permanent dentition. The primary dentition serves an important role in development and proper function of the oral cavity. The primary incisor teeth maintain function for approximately five years of a child's life and the primary molars are functional for nine

years. If these teeth are lost prematurely due to untreated decay, it is possible that the permanent teeth will not erupt in their correct alignment which could lead to misalignment and decrease of function of the oral cavity.

## CHAPTER 2

### REVIEW OF THE LITERATURE

A review of the literature concerning access to dental care involves critical elements. These elements include living in rural areas and/or not having insurance. International findings as well as South Central Kentucky findings will be presented with respect to institutionalized individuals. This chapter will examine what is currently known in the field as well as describe areas that need further research.

Kandel, Richards, and Binkley (2012) performed a study to determine the prevalence of untreated caries in North Central Kentucky and to examine the relationships between the available demographic variables and untreated childhood caries as reported on the forms from the Smile Kentucky! program.

The data used to conduct this study were taken from 3,488 parental demographic and consent forms and from the Smile Kentucky! screening forms filled out by the dentist or dental hygienist at the appointment performed in November 2008. These children ranged from age five to age 13 with a mean age of 9.3 years. The demographic and consent forms had information such as the child's gender, age, race, elementary school, grade in school, home ZIP code, and seven questions regarding the child's dental insurance status and home care. From this information, the analysts grouped the patients according to ZIP code and whether there was a presence of untreated carious lesions.

Using chi-square, bivariate, and multivariate testing, the results of the information collected revealed that 92% of the children had visited the dentist within the past 3 years and 33% had caries present at the time of the screening. The majority of the caries were localized to one-quadrant of the mouth and one quarter of the children was classified as needing urgent dental treatment. Of the seven variables tested, five of them were found to be significant. These five included being a minority race ( $p<0.001$ ), fair or poor parental assessment of oral hygiene, having government or no insurance, not having a dental visit, and living in the metropolitan area. Living in a metropolitan area and the presence of caries had the greatest correlation; 40% of the children in metropolitan areas presented with untreated caries whereas only 26% of children from non-metropolitan areas had untreated caries.

Also interested in the link between living in rural areas and/or not having insurance and the lack of access to dental care, Dawkins, et al. (2013) conducted a study to determine if untreated dental caries were more likely to be present in older children living in rural areas without insurance.

The data used to conduct this study were taken from children ages 6 to 15 who participated in the school-based dental sealant program through the Western Kentucky University Mobile Dental Unit between September 2006 and May 2011. From the random selection, descriptive statistics were taken including age, gender, race, whether they had insurance, and urban versus rural location. After collecting this information, the examiners then determined whether or not these patients presented with caries.

Using chi-square testing, the researchers compared sociodemographic characteristics with the presence and severity of dental caries. Next, a logistic regression model was developed to determine factors associated with untreated caries and sociodemographic differences. The results indicated that the proportion of children having untreated dental caries was 49.7% and the mean number of carious teeth per child was 2.0. When comparing the ages of children, it was found that more untreated dental caries with greater severity were found in older children living in rural residential locations. Odds ratio analysis revealed that not having private insurance and living in rural areas were both correlated to an increase in untreated dental caries.

Ohsuka, Chino, et al. (2009) performed a study to investigate the incidence of caries in infants in Japan. The investigators also noted variations between urban and rural areas of residence. The subjects used for this study were 232 infants, including 111 males and 121 females, between the ages of 1.6 and 3.

Using the dmft index (decayed/missing/filled teeth), chi-squares, and t tests, the researchers calculated the average number of teeth with caries. From these tests, it was found that there was a significant difference in the caries rates of the older children based on area of residence. Over 25% of 3-year old children from urban areas presented with dental caries as compared to 47.6% of three-year old children from rural areas ( $p < .01$ ).

Rodakowska, Wilczynska-Borawska, Baginska, and Stokowska (2013) performed a study to investigate the improvement of dental caries in rural and urban areas over a seven-year period. The data were collected from 445 children living in the Podlaskie region of Poland. In 2003, 101 boys and 87 girls were examined; of these 188 children,

98 resided in urban areas and 90 in rural areas. In 2010, 134 boys and 123 girls were examined; of these 257 adolescents, 157 resided in urban areas and 70 from rural areas.

Using the Shapiro-Wilk and Mann-Whitney U tests, the researchers found that in 2003, children living in urban areas had a mean DMFT of 4.76 whereas those living in rural areas had a mean DMFT of 4.42. When data was collected again in 2010, the mean DMFT of those living in urban areas had decreased to 3.36 and the mean DMFT of those living in rural areas had increased to 4.77. From this information, a conclusion was made that the caries rates in both urban and rural areas were high, but there was a greater progression in rural areas within seven years.

The current study will incorporate what has been reported in the literature and further develop the relationship between living in rural areas and/or not having insurance resulting in a lack of access to dental care. Specifically, the researcher will examine children of South Central Kentucky to further develop the link of children in rural areas presenting with more dental caries than those residing in urban areas due to a lack of access to care.



## CHAPTER 3

### METHODS AND METHODOLOGY

Western Kentucky University provides students the opportunity to work on the mobile dental unit. Using these records, the researcher reviewed a representative sample and gathered information from each chart including area of residence, caries history, age, gender and other demographic information. In order to collect the data, the researcher used the records of the Western Kentucky University Mobile Dental Unit to assess the area of residence of fifteen patients, whether or not they have insurance, and if there is a presence of dental decay. From these data the researcher then determined if there is a correlation between rural conditions and lack of access to care in relation to untreated tooth decay. Several factors may influence the results. Since patient records were randomly selected, it is imperative the researcher selected a truly random sample. Care was taken to ensure the patient records will be representative of the larger population. The purpose of this descriptive study was to determine if this model for improving access to care can be used on a larger scale.

## CHAPTER 4

### RESULTS

From the Western Kentucky University Mobile Dental Unit records, the researcher collected fifteen DMF scores from each urban and rural school. The gender of patients randomly selected was divided equally by gender, ages of subjects residing in both urban and rural areas ranged from 6-8, and the majority of both urban and rural patients had Medicaid. The DMF scores of those who lived in urban areas ranged from 0-14 with a mean DMF of 2.9. The DMF scores of those who lived in rural areas ranged from 0-9 with a mean DMF of 2.2. Four of the fifteen subjects from urban schools had a DMF of 0 while seven of the fifteen subjects from rural areas had a DMF of 0. The cumulative DMF score of subjects who went to urban schools was 43 while the cumulative DMF score of subjects who went to rural schools 33.

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## CHAPTER 5

### CONCLUSION

After analyzing the data collected, it was evident in this particular study that urban and rural areas had nearly the same DMF scores, which would indicate similar access to care. These results are contrary to what has been reported in the literature; that rural areas have higher DMF scores, lower rates of insurance and less access to care. As stated in chapter four, the cumulative DMF of urban areas was higher than that of rural areas and the presence of insurance was spread equally. The significance of the results may indicate that mobile units in the Kentucky area are improving access to care. The mobile dental unit provides knowledge of the current condition of the oral cavity and provides patients with a list of dental professionals they make seek treatment from.

## REFERENCES

- Dawkins, E., Michimi, A., Ellis-Griffith, G., Peterson, T., Carter, D., & English, G. (2013). Dental caries among children visiting a mobile dental clinic in south central kentucky: a pooled cross-sectional study. *BMC Oral Health*, 13(19).
- Ohsuka, K., Chino, N., Nakagaki, H., Kataoka, I., Oshida, Y., Ohsawa, I., & Sato, Y. (2009). Analysis of risk factors for dental caries in infants: a comparison between urban and rural areas. *Enviornment Health Preventive Medicine*, 14(2).
- Rodakowska, E., Wilczyńska-Borawska, M., Bagińska, J., & Stokowska, E. (2013). Epidemiological analysis of dental caries in 12-year-old children residing in urban and rural settings in the Podlaskie region of north-eastern Poland. *Annals Of Agricultural And Environmental Medicine*., 20(2), 325-328.
- Smaldone, A. M., Edelstein, B. L., DDS, & Yoon, R. K., DDS. (2012). Early childhood caries screening tools. *Journal of the American Dental Association*, 143(7), 12.